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VARIETY TESTS OF SUGARCANES IN LOUISIANA DURING THE CROP YEAR 1930–31

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INTRODUCTION

Considering the limitations imposed by climatic and other factors in Louisiana and the consequent greatly restricted range of varieties from which to choose, it is a difficult, if not impossible, task to find or breed sugarcane varieties that are ideally fitted to the demands of both field and factory in every respect. However, as a result of cooperative activities of the United States Department of Agriculture, the Louisiana Agricultural Experiment Station, and the American Sugar Cane League in the importation, breeding, and testing of sugarcane varieties, there is now available to the Louisiana grower an assortment of varieties of proved value from which to select those that will fit reasonably well his particular needs. It is generally known that sugarcane varieties, in addition to showing characteristic differences in their susceptibility to different diseases, also differ in their adaptability to soil and climatic conditions. For example, in the past, Black Cheribon (known in Louisiana as Louisiana Purple) and D–74 did not show equal adaptation to conditions in all sections of the State, as shown by the fact that D–74 almost completely displaced Louisiana Purple in the southeastern parishes, while the latter remained the preferred variety in the Lafayette section up to the time of its failure on account of mosaic. Varietal adaptation is not limited to local differences, for on almost every plantation are found widely different soil areas on which the same variety will respond differently. Planning a program of planting so as to utilize most

[1] Acknowledgment is made to C. C. Krumbhaar, agent, Division of Sugar Plant Investigations, for cooperation in conducting some of the tests reported in this circular; to the Division of Soil Fertility of the Bureau of Chemistry and Soils, and to A. M. O'Neal, of that division, and S. J. Breaux, of the Louisiana State University, for their valued cooperation in the phase of the investigation involving a study of the relation between soil type and varietal performance, and in identifying the characteristic soil types of plots of land on which stubble variety tests from previous plant-cane tests were carried on; and to the managements of the Southdown and Raceland factories for their excellent cooperation in conducting the mill tests.

effectively all agricultural areas on a given plantation without unduly increasing the number of varieties planted is very important and will frequently be the deciding factor between success and failure.

In this circular are summarized the results of comparative plantation tests with promising sugarcane varieties during the crop year 1930–31 to determine their relative adaptation to various representative soil conditions prevailing in the Louisiana cane-growing area. Preliminary tests of several hundred other promising varieties, including imported ones and seedling varieties bred at the United States Sugar Plant Field Station, Canal Point, Fla., were carried on during the year. Neither the scope nor the results of these latter tests were extensive enough to justify inclusion in this circular, and publication will be deferred until such time as individual varieties may show definite promise of being suitable for commercial culture.

SEASONAL CONDITIONS

Temperatures during the early months of 1931 were on the whole considerably below normal. The departure from normal was particularly marked during March and April, a condition which, besides greatly delaying the growth of sugarcane, was conducive to excessive red-rot damage, which was most severe in P.O.J. 213.[2] The cool spring was followed by unusually dry weather during May, June, July, and August, resulting in a further delay of vegetative growth. The drought during these months was very serious in some of the western parishes, as shown by the rainfall recorded at Erath, Oaklawn, and Bayou Sale. (Table 1.) The rainfall during the harvest months of October, November, and December was excessive and, combined with accompanying high temperatures, resulted in greatly retarding the ripening of sugarcane. The absence of killing freezes during that period prevented the freeze damage normally expected, and the unsatisfactory ripening conditions were partly offset by the fact that the ripening processes extended until the end of the tests. This protracted frost-free period, however, did not compensate for the unfavorable effects of earlier climatic conditions on growth and maturity.

TABLE 1.—*Amount and distribution of rainfall at seven sugarcane test fields in Louisiana during 1931*

Station	January		February		March		April		May		June		July	
	Days	Inches	Days	Inches	Days	Inches	Days	Inches	Days	Inches	Days	Inches	Days	Inches
Erath	3	5.25	4	3.08	4	2.70	2	2.00	2	1.35	6	2.23	8	4.86
Cypremort	4	8.00	4	5.00	6	7.18	4	2.75	3	2.78	3	1.78	6	4.78
Oaklawn	5	4.03	4	3.51	4	2.70	4	1.70	4	2.45	1	.50	6	3.95
Bayou Sale	4	4.00	4	5.00	4	4.00	4	1.50	2	2.00	0	0	7	5.25
Raceland	5	4.29	5	4.48	6	5.80	6	4.36	6	2.18	2	1.28	7	9.41
Greenwood	3	4.77	4	3.67	7	5.10	4	1.83	1	1.41	7	2.35	11	10.25
Houma	5	3.85	5	4.60	4	2.95	5	4.85	2	1.33	6	3.81	8	10.15
Normal for Houma	----	3.64	----	4.41	----	3.29	----	4.01	----	3.51	----	5.50	----	8.77

[2] An explanation of the abbreviations used to designate sugarcane varieties appears as a footnote to Table 2, p. 4.

TABLE 1.—*Amount and distribution of rainfall at seven sugarcane test fields in Louisiana during 1931*—Continued

Station	August		September		October		November		December		Total rainfall	
	Days	Inches	Days	Inches	Days	Inches	Days	Inches	Days	Inches	Days	Inches
Erath	10	4.29	6	3.65	4	2.85	4	4.09	6	6.61	59	42.96
Cypremort	6	7.00	2	1.18	4	3.75	6	4.75	9	9.25	57	58.20
Oaklawn	7	5.50	8	4.75	5	4.25	7	3.30	12	5.95	67	42.59
Bayou Sale	5	2.25	3	2.25	4	3.00	5	3.75	9	7.50	51	40.50
Raceland	10	6.09	5	3.94	8	5.40	5	3.85	10	10.36	75	61.44
Greenwood	11	4.60	3	3.45	4	3.33	3	2.70	11	9.19	69	52.65
Houma	11	7.89	6	3.41	7	7.02	3	1.32	8	10.32	70	61.50
Normal for Houma	------	6.99	------	5.71	------	3.43	------	2.71	------	4.75	------	56.72

EXPERIMENTAL METHODS

Methods of plot arrangement, sugarcane sampling, and statistical interpretation employed in these experiments have been described in previous publications.[3]

PLANT-CANE VARIETY TESTS ON DIFFERENT SOILS

It is customary throughout the greater part of the sugarcane district of Louisiana to divide the sugarcane-producing soils into three groups, namely:

1. Light soils, usually found adjacent to streams and consisting largely of members of the Yazoo series.
2. Heavy soils, occurring as a rule in the lower-lying sections of the flood plain and represented by soils of the Sharkey series.
3. Mixed soils, constituting a group intermediate between the light and heavy soils.

By far the greater portion of sugarcane in Louisiana is grown on light or mixed soils. The black, heavy soils are the marginal lands of the Louisiana sugarcane district, and their history shows that only under very favorable market conditions has their cultivation been definitely profitable. A recognized factor in this connection is transportation; in rainy weather it is exceedingly difficult and expensive to harvest sugarcane on the poorly drained heavy soils. The determining factor, however, has been the fact that up to the time of the introduction of C. P. 807 by the United States Department of Agriculture, no variety could be depended on either to give satisfactory stands or to stubble satisfactorily under the prevailing drainage conditions. The results of limited trials having demonstrated the ability of C. P. 807 to produce profitable yields of cane on these heretofore undesirable lands, the need of conducting variety tests on such soil areas became apparent. Accordingly, the investigational work with sugarcane varieties during the crop year 1930–31 was so planned as to include experiments on areas of heavy soils in representative localities, in addition to the usual tests on the dominant types of

[3] RANDS, R. D., and SHERWOOD, S. F. YIELD TESTS OF DISEASE-RESISTANT SUGAR CANES IN LOUISIANA. U. S. Dept. Agr. Dept. Circ. 418, 20 p., illus. 1927.
——— SHERWOOD, S. F., and STEVENS, F. D. SUGAR-CANE VARIETY TESTS IN LOUISIANA DURING THE CROP YEAR 1926–27. U. S. Dept. Agr. Circ. 36, 15 p. 1928.
ARCENEAUX, G., and STEVENS, F. D. VARIETY TESTS OF SUGARCANES IN LOUISIANA DURING THE CROP YEAR 1927–28. U. S. Dept. Agr. Circ. 88, 16 p., illus. 1929.
——— and GIBBENS, R. T. VARIETY TESTS OF SUGARCANES IN LOUISIANA DURING THE CROP YEAR 1928–29. U. S. Dept. Agr. Circ. 162, 24 p. 1931.
——— STOKES, I. E., and BISLAND, R. B. VARIETY TESTS OF SUGARCANES IN LOUISIANA DURING THE CROP YEAR 1929–30. U. S. Dept. Agr. Circ. 187, 24 p. 1931.

soil utilized for cane growing. Each variety group test was located on a uniform area of the desired soil type, as determined by a previously conducted reconnaissance and soil survey involving soil reaction (pH) determinations on soil samples collected at numerous points on the area under consideration and profile and soil-texture studies.[4]

All plantings were made between September 25 and October 10, as past experiments indicated that most of the varieties under observation would respond most favorably within this period. Plantation practices were followed in every instance, and it is believed that the stands obtained were representative of those obtained under comparable plantation conditions.

TESTS ON LIGHT SOILS

The results of sugarcane variety tests on light soils consisting of Yazoo silt or sandy loam or related types, conducted on six representative plantations, are summarized in Tables 2 to 9, inclusive. Because of the inferiority of P. O. J. 36 to P. O. J. 36–M in yield of sugar per ton of cane in the absence of compensatory difference in yields of cane, as definitely established by previous field experiments, P. O. J. 36 was included in only one of the above-mentioned tests. The results of this test, conducted at the United States Sugar Plant Field Station, Houma, La. (Table 7) give additional evidence that P. O. J. 36–M is the more desirable variety, as indicated by the observed difference of 5.9 pounds of sugar per ton of cane and 189 pounds of sugar per acre in favor of P. O. J. 36–M.

TABLE 2.—*Results of plant-cane variety tests on light soil (Yazoo very fine sandy loam type) on Godchaux plantation, Raceland, La., in 1931*

Variety [a]	Acre yield of cane [b]	Laboratory-mill juice analyses at harvest, Dec. 22			Indicated available 96° sugar at harvest		Cane for 1 ton of sugar
		Brix	Sucrose	Purity	Per ton of cane	Per acre	
	Tons [c]		*Per cent*		*Pounds*	*Pounds*	*Tons*
P. O. J. 36–M	24.71	13.31	9.72	73.03	120.9	2,987	16.54
P. O. J. 213	20.99	12.29	9.04	73.55	113.2	2,376	17.67
P. O. J. 234	21.31	12.66	9.09	71.80	109.4	2,331	18.28
C. P. 807	33.91	13.66	10.39	76.06	132.7	4,500	15.07
Co. 281	26.89	14.56	10.95	75.21	138.8	3,732	14.41
Co. 290	37.45	14.16	10.37	73.23	129.1	4,835	15.49

[a] Many varieties of sugarcane are commonly designated by letters or other abbreviations indicating the origin of the seedling cane. The meanings of such designations for the varieties mentioned throughout this circular are as follows: Co.=Coimbatore (India) seedlings; C. P.=Canal Point (Fla.) seedlings; P. O. J.=Proefstation Oost Java seedlings; P. O. J. 36–M=Mingka selection of P. O. J. 36; U. S.=U. S. Department of Agriculture, best selections from Canal Point seedlings.

[b] Average of 10 replications. Plots of one-fortieth of an acre. Probable error of the difference=±0.64 ton. In the case of Co. 290 the average is based on only 3 replications and the probable error of the difference in comparisons involving this variety is correspondingly greater.

[c] Tons of 2,000 pounds are used in tests reported in this circular.

[4] For more detailed description of soil areas and soil types on which sugarcane is grown in Louisiana see the following publication: O'NEAL, A. M., BREAUX, S. J., JR., SCHREINER, O., and HURST, L. A., SOIL FERTILITY INVESTIGATIONS SUGAR CANE DISTRICT OF LOUISIANA. La. Agr. Expt. Sta. [Bul. 222], 45 p., illus. 1931.

TABLE 3.—*Results of plant-cane variety tests on light soil (Yazoo very fine sandy loam type) on Greenwood plantation, Thibodaux, La., in 1931*

Variety	Acre yield of cane [1]	Laboratory-mill juice analyses at harvest, Dec. 16			Indicated available 96° sugar at harvest		Cane for 1 ton of sugar
		Brix	Sucrose	Purity	Per ton of cane	Per acre	
	Tons		*Per cent*		*Pounds*	*Pounds*	*Tons*
P. O. J. 36-M	27.11	15.23	11.96	78.53	155.8	4,224	12.84
P. O. J. 213	28.39	14.82	11.95	80.63	158.2	4,491	12.64
P. O. J. 234	29.16	15.76	12.88	81.72	171.7	5,007	11.65
C. P. 807	43.11	14.80	11.77	79.53	154.5	6,660	12.94
Co. 281	29.94	15.95	12.87	80.69	170.4	5,102	11.74
Co. 290	30.91	14.81	11.37	76.77	146.1	4,516	13.69

[1] Average of 11 replications. Plots of one-fortieth of an acre. Probable error of the difference=±1.59 tons. In the case of Co. 290 the average is based on only 3 replications, and the probable error of the difference in comparisons involving this variety is correspondingly greater.

TABLE 4.—*Results of plant-cane variety tests on light soil (St. Mary silt loam type) on Midway plantation, Bayou Sale (Foster post office), La., in 1931*

Variety	Acre yield of cane [1]	Laboratory-mill juice analyses at harvest, Nov. 30			Indicated available 96° sugar at harvest		Cane for 1 ton of sugar
		Brix	Sucrose	Purity	Per ton of cane	Per acre	
	Tons		*Per cent*		*Pounds*	*Pounds*	*Tons*
P. O. J. 36-M	23.71	15.67	12.67	80.85	168.0	3,983	11.90
P. O. J. 213	20.61	15.28	12.62	82.59	169.3	3,489	11.81
P. O. J. 234	23.92	16.72	14.22	85.05	194.1	4,643	10.30
C. P. 807	30.50	15.27	12.57	82.32	168.4	5,136	11.88
Co. 281	19.61	15.83	13.07	82.56	175.3	3,438	11.41
Co. 290	33.26	15.85	12.44	78.48	162.1	5,391	12.34

[1] Average of 11 replications in plots of one-fortieth of an acre. Probable error of the difference =±0.58 ton. In the case of Co. 290 the average is based on only 3 replications, and the probable error of the difference in comparisons involving this variety is correspondingly greater.

TABLE 5.—*Results of plant-cane variety tests on light soil (Pharr silt loam type) on Oaklawn plantation, Franklin, La., in 1931*

Variety	Acre yield of cane [1]	Laboratory-mill juice analyses at harvest, Dec. 10			Indicated available 96° sugar at harvest		Cane for 1 ton of sugar
		Brix	Sucrose	Purity	Per ton of cane	Per acre	
	Tons		*Per cent*		*Pounds*	*Pounds*	*Tons*
P. O. J. 36-M	22.96	15.16	11.89	78.43	154.7	3,552	12.93
P. O. J. 213	16.52	14.30	11.11	77.69	143.8	2,376	13.91
P. O. J. 234	18.46	15.10	12.08	80.00	159.1	2,937	12.57
C. P. 807	30.45	14.62	11.34	77.56	146.7	4,467	13.63
Co. 281	19.18	15.44	12.27	79.47	161.0	3,088	12.42
Co. 290	30.22	15.05	11.16	74.15	140.2	4,237	14.27

[1] Average of 11 replications. Plots of one-fortieth of an acre. Probable error of the difference =±0.48 ton. In the case of Co. 290 the average is based on only 3 replications, and the probable error of the difference in comparisons involving this variety is correspondingly greater.

TABLE 6.—*Results of plant-cane variety tests on light soil (Yazoo very fine sandy loam type) on Alma plantation, Lakeland, La., in 1931*

Variety	Acre yield of cane [1]	Laboratory-mill juice analyses at harvest, Dec. 7			Indicated available 96° sugar at harvest		Cane for 1 ton of sugar
		Brix	Sucrose	Purity	Per ton of cane	Per acre	
	Tons		*Per cent*		*Pounds*	*Pounds*	*Tons*
P. O. J. 36–M	24.15	15.03	11.67	77.64	151.0	3,647	13.24
P. O. J. 213	20.27	14.50	11.45	78.96	149.7	3,034	13.36
P. O. J. 234	26.02	15.30	12.01	78.50	156.4	4,070	12.79
C. P. 807	40.12	13.91	10.25	73.69	128.2	5,143	15.60
Co. 281	27.28	15.38	12.18	79.19	159.5	4,351	12.54
Co. 290	39.32	15.04	11.26	74.87	142.4	5,599	14.04

[1] Average of 9 replications. Plots of one-fortieth of an acre. Probable error of the difference=±1.39 tons. In the case of Co. 290 the average is based on only 3 replications, and the probable error of the difference in comparisons involving this variety is correspondingly greater.

TABLE 7.—*Results of plant-cane variety tests on light soil (Crevasse silty clay loam type) at the United States Sugar Plant Field Station, Houma, La., in 1931*

Variety	Acre yield of cane [1]	Laboratory-mill juice analyses						Indicated available 96° sugar at harvest		Cane for 1 ton of sugar
		Preliminary analyses, Nov. 11			Harvest analyses, Dec. 17–18					
		Brix	Sucrose	Purity	Brix	Sucrose	Purity	Per ton of cane	Per acre	
	Tons		*Per cent*			*Per cent*		*Pounds*	*Pounds*	*Tons*
P. O. J. 36	23.81	14.02	10.04	71.61	15.20	12.05	79.28	157.9	3,760	12.67
P. O. J. 36–M	24.11	14.30	10.41	72.79	15.57	12.44	79.90	163.8	3,949	12.21
P. O. J. 213	24.28	14.52	11.06	76.17	15.97	13.34	83.53	180.1	4,373	11.10
P. O. J. 234	21.65	15.60	12.10	77.56	16.66	14.06	84.39	191.0	4,135	10.47
C. P. 807	31.75	13.98	10.42	74.53	15.23	12.25	80.43	161.9	5,140	12.35
Co. 281	23.83	15.02	11.24	74.83	16.59	13.79	83.12	185.8	4,428	10.76

[1] Average of 10 replications. Plots of one-fortieth of an acre. Probable error of the difference=±0.58 ton.

TABLE 8.—*Results of plant-cane variety tests on light soil (Yazoo silt loam type with slight admixture of Yazoo very fine sandy loam type) at the United States Sugar Plant Field Station, Houma, La., in 1931*

Variety	Acre yield of cane [1]	Laboratory-mill juice analyses						Indicated available 96° sugar at harvest		Cane for 1 ton of sugar
		Preliminary analyses, Nov. 11			Harvest analyses, Dec. 4			Per ton of cane	Per acre	
		Brix	Sucrose	Purity	Brix	Sucrose	Purity			
	Tons		*Per cent*			*Per cent*		*Pounds*	*Pounds*	*Tons*
P. O. J. 213	20.86	13.59	9.77	71.89	14.37	11.52	80.17	152.0	3,171	13.16
C. P. 1079	25.55	12.61	8.06	63.91	13.46	9.37	69.61	112.6	2,877	17.76
C. P. 1093	24.86	------	------	------	12.79	8.53	66.69	99.5	2,474	20.10
C. P. 1193	26.34	13.77	8.85	64.27	13.90	9.41	67.70	110.7	2,916	18.07
C. P. 1282	29.37	12.67	8.24	65.03	12.88	8.92	69.25	106.6	3,131	18.76
C. P. H. 22	24.78	13.43	9.43	70.21	13.73	10.23	74.51	128.9	3,194	15.52
C. P. H. 24	16.38	15.10	11.27	74.63	15.33	12.08	78.80	157.7	2,583	12.68
C. P. H. 145	23.84	15.58	11.82	75.86	15.68	12.47	79.53	163.8	3,905	12.21
C. P. H. 153	21.41	13.84	8.78	63.43	14.86	10.35	69.65	124.5	2,666	16.06

[1] Average of 5 replications. Plots of one-fortieth of an acre. Probable error of the difference=±1.17 tons.

TABLE 9.—*Summary of the results of plant-cane tests with important varieties of sugarcane on light soil in Louisiana during 1931*

Variety	Raceland (Table 2)			Greenwood (Table 3)			Bayou Sale (Table 4)			Oaklawn (Table 5)		
	Acre yield of cane [1]	Indicated yield of available 96° sugar		Acre yield of cane [1]	Indicated yield of available 96° sugar		Acre yield of cane [1]	Indicated yield of available 96° sugar		Acre yield of cane [1]	Indicated yield of available 96° sugar	
		Per ton of cane	Per acre		Per ton of cane	Per acre		Per ton of cane	Per acre		Per ton of cane	Per acre
	Tons	*Lbs.*	*Lbs.*	*Tons*	*Lbs.*	*Lbs.*	*Tons*	*Lbs.*	*Lbs.*	*Tons*	*Lbs.*	*Lbs.*
P. O. J. 36-M	24.71	120.9	2,987	27.11	155.8	4,224	23.71	168.0	3,983	22.96	154.7	3,552
P. O. J. 213	20.99	113.2	2,376	28.39	158.2	4,491	20.61	169.3	3,489	16.52	143.8	2,376
P. O. J. 234	21.31	109.4	2,331	29.16	171.7	5,007	23.92	194.1	4,643	18.46	159.1	2,937
C. P. 807	33.91	132.7	4,500	43.11	154.5	6,660	30.50	168.4	5,136	30.45	146.7	4,467
Co. 281	26.89	138.8	3,732	29.94	170.4	5,102	19.61	175.3	3,438	19.18	161.0	3,088
Co. 29	37.45	129.1	4,835	30.91	146.1	4,516	33.26	162.1	5,391	30.22	140.2	4,237

Variety	Alma (Table 6)			Houma (Table 7)			Average		
	Acre yield of cane [1]	Indicated yield of available 96° sugar		Acre yield of cane [1]	Indicated yield of available 96° sugar		Acre yield of cane	Indicated yield of available 96° sugar	
		Per ton of cane	Per acre		Per ton of cane	Per acre		Per ton of cane	Per acre
	Tons	*Pounds*	*Pounds*	*Tons*	*Pounds*	*Pounds*	*Tons*	*Pounds*	*Pounds*
P. O. J. 36	------	------	------	23.81	157.9	3,760	------	------	------
P. O. J. 36 M	24.15	151.0	3,647	24.11	163.8	3,949	24.46	152.2	3,724
P. O. J. 213	20.27	149.7	3,034	24.28	180.1	4,373	21.84	153.66	3,356
P. O. J. 234	26.02	156.4	4,070	21.65	191.0	4,135	23.42	164.56	3,854
C. P. 807	40.12	128.2	5,143	31.75	161.9	5,140	34.97	147.96	5,174
Co. 281	27.28	159.5	4,351	23.83	185.8	4,428	24.45	164.54	4,023
Co. 290	39.32	142.4	5,599	------	------	------	34.23	143.62	4,916

[1] The probable error of the difference=±0.64 ton at Raceland, ±1.59 tons at Greenwood, ±0.58 ton at Bayou Sale, ±0.48 ton at Oaklawn, ±1.39 tons at Alma, and ±0.58 ton at Houma.

In six tests (Tables 2 to 7, inclusive) P. O. J. 36–M gave uniformly satisfactory yields of cane and except in the Raceland test (Table 2) gave yields of sugar exceeding 150 pounds per ton in each test. The yields of 24.46 tons of cane and 3,724 pounds of sugar per acre in the average of the six tests are considered very satisfactory under the prevailing conditions.

While satisfactory yields of cane and sugar per acre were obtained with P. O. J. 213 at Greenwood and Houma (Tables 3 and 7), its yields of cane per acre at Raceland, Bayou Sale, Oaklawn, and Alma were significantly below those obtained with P. O. J. 36–M, with correspondingly low yields of sugar per acre. Its unsatisfactory performance undoubtedly resulted from its susceptibility to injury by red rot, the prevalence of which was accentuated by climatic conditions during the year. In the average of the six tests, P. O. J. 213 was lower in yield of cane than either P. O. J. 36–M or P. O. J. 234, with an average yield of sugar per acre 368 pounds below the corresponding yield for P. O. J. 36–M and 498 pounds below that of P. O. J. 234. The comparative yields of cane and sugar obtained from this variety were very much below those obtained in previous years.

P. O. J. 234 demonstrated its ability to produce satisfactory yields of cane under conditions extremely conducive to red-rot damage. Its average yield of 23.42 tons of cane per acre for the six tests on light soil is 1.58 tons in excess of the average yield obtained with P. O. J. 213 and only 1.04 tons less than that obtained with P. O. J. 36–M. In the average of all tests and in every test except at Raceland,

P. O. J. 234 maintained its usual lead over all other P. O. J. varieties in yield of sugar per ton of cane, which, combined with its satisfactory yields of cane, resulted in an average yield of sugar per acre exceeding that of any of the other P. O. J. varieties.

Cane of acceptable commercial quality, as judged by juice analyses, was obtained in the case of C. P. 807, and in the individual tests its yields of cane per acre varied from 6.58 to 14.10 tons more than the yield from the best P. O. J. variety in the test, and from 7.02 to 13.17 tons more than the yield from Co. 281. Its average yield of 5,174 pounds of sugar per acre in the six tests exceeded that from P. O. J. 234 by 1,320 pounds and that from Co. 281 by 1,151 pounds. Its yield of sugar per ton of cane compared favorably with those from P. O. J. 36–M and P. O. J. 213 in every test except at Alma plantation (Table 6), where it was measurably surpassed in sugar content by P. O. J. 36–M and P. O. J. 213.

The results obtained with Co. 281 in these tests are considered satisfactory. Its average yield of cane per acre, while appreciably lower than that of C. P. 807, was almost the same as obtained with P. O. J. 36–M, with an indicated average yield of sugar exceeding that of P. O. J. 36–M by over 12 pounds per ton of cane. Confirming the results obtained in past years, Co. 281 did not demonstrate so high a degree of adaptability to conditions in the western parishes as in the eastern parishes. This is indicated by the results obtained at Bayou Sale and Oaklawn. (Tables 4 and 5.) In each of these tests Co. 281 fell below P. O. J. 36–M in yield of cane per acre, and in spite of its greater yield of sugar per ton of cane the amount of sugar per acre was about 500 pounds less. At Raceland, Greenwood, and Alma, Co. 281 in yields of cane per acre was slightly higher than corresponding yields obtained from P. O. J. 36–M. At Houma practically identical yields of cane per acre were obtained with Co. 281 and P. O. J. 36–M. In the last-named four tests Co. 281 was unquestionably of a quality superior to P. O. J. 36–M, as judged by the juice analyses, and its yield of sugar per acre was consistently in excess of corresponding yields from P. O. J. 36–M.

While the results obtained with Co. 290 are not considered as reliable as those obtained with other varieties, because of the small number of replications made necessary by the limited quantity of seed available, they indicate that this variety will approximately equal C. P. 807 in tons of cane per acre. From the standpoint of available sugar per ton of cane, this variety appears to be inferior to Co. 281, P. O. J. 213, P. O. J. 36–M, and C. P. 807. It is realized, however, that these results, because of their limited nature, can not be taken as conclusive and that more information will be needed before the value of Co. 290 can be definitely determined. Its performance, as shown by all these tests and particularly by those at Bayou Sale and Alma, indicates that Co. 290 may possibly find commercial adaptability under Louisiana conditions. Its large barrel and low fiber content undoubtedly tend to make this variety a desirable one from a field-handling and milling standpoint. Like Co. 281, this variety is susceptible to attacks by the mosaic disease. To what extent this characteristic may limit its value for culture in Louisiana remains to be determined.

At Oaklawn, because of damage resulting from an unusually heavy infestation of the cane beetle (*Euetheola rugiceps*), the observed yields

of cane per acre are comparatively low in the case of all varieties. (Table 5.) Despite very serious damage, however, both C. P. 807 and Co. 290 gave very satisfactory results, owing, it would seem, to their characteristic vigor, which permitted their throwing out new shoots to replace the ones killed back as a result of the insect damage. P. O. J. 213, on the other hand, already weakened by severe red-rot damage, was unable to overcome satisfactorily the insect damage. Many of the plants attacked died, resulting in extremely gappy stands with consequently prolonged suckering, which probably accounts for the comparatively low indicated yield of sugar per ton of cane.

The results obtained in the Raceland test (Table 2) afforded an opportunity to study varietal responses under somewhat unusual conditions. On September 6 the plantation on which the test plots were located was visited by a severe windstorm, which caused most of the varieties to lodge rather badly. This damage was particularly noticeable in the case of P. O. J. 234 and P. O. J. 213. The former was blown almost flat to the ground and subsequently developed numerous aerial roots. The result of this lodged condition is plainly indicated in the juice analyses of all varieties and particularly in those of P. O. J. 234, which gave the lowest indicated yield of sugar per ton of cane of all the varieties in the test. Co. 281 showed the highest yield of sugar per ton of cane and was closely followed by C. P. 807. Analyses of samples of P. O. J. 234 from this test showed a fiber content of 15.28 per cent. This extremely high fiber content resulted, no doubt, from the abnormal adventitious root development which is generally observed with this variety under conditions of severe lodging. While this condition is not representative, it is not of infrequent occurrence and illustrates characteristic weaknesses, particularly important in the case of P. O. J. 234, frequently overlooked in evaluating varieties.

TESTS ON HEAVY SOILS

Results of various tests conducted on heavy soils consisting of Sharkey clay or related types are summarized in Tables 10 to 15, inclusive. The varieties P. O. J. 213, C. P. 807, and Co. 281 were tested at five localities, and more limited tests were conducted with P. O. J. 36, P. O. J. 36–M, P. O. J. 234, and Co. 290.

TABLE 10.—*Results of plant-cane variety tests on heavy soil (Sharkey clay) at the United States Sugar Plant Field Station, Houma, La., in 1931*

Variety	Acre yield of cane [1]	Laboratory-mill juice analyses at harvest, Dec. 17–22			Fiber in cane	Indicated available 96° sugar at harvest		Cane for 1 ton of sugar
		Brix	Sucrose	Purity		Per ton of cane	Per acre	
	Tons		*Per cent*		*Per cent*	*Pounds*	*Pounds*	*Tons*
P. O. J. 36	20.38	15.99	13.12	82.05	13.64 ±0.13	175.4	3,575	11.40
P. O. J. 36–M	18.94	16.13	13.19	81.77	13.90 ±0.32	176.0	3,333	11.36
P. O. J. 213	18.90	16.28	13.76	84.52	13.62 ±0.11	187.1	3,536	10.69
C. P. 807	26.79	15.61	12.88	82.51	15.22 ±0.20	172.7	4,627	11.58
Co. 281	18.40	16.85	14.01	83.14	13.61 ±0.12	188.9	3,476	10.59
Co. 290	28.02	15.85	12.39	78.17	11.27 ±0.13	161.0	4,511	12.42

[1] Average of 9 replications. Plots of one-fortieth of an acre. Probable error of the difference=±0.77 ton.

TABLE 11.—*Results of plant-cane variety tests on heavy soil (Sharkey clay) on Crescent farm, Southdown plantation, Houma, La., in 1931*

Variety	Acre yield of cane [1]	Laboratory-mill juice analyses at harvest, Dec. 14			Indicated available 96° sugar at harvest		Cane for 1 ton of sugar
		Brix	Sucrose	Purity	Per ton of cane	Per acre	
	Tons		*Per cent*		*Pounds*	*Pounds*	*Tons*
P. O. J. 36-M	13.03	15.89	13.32	83.83	180.2	2,348	11.10
P. O. J. 213	8.94	15.93	13.67	85.81	187.3	1,674	10.68
P. O. J. 234	15.16	17.25	15.07	87.36	208.4	3,159	9.60
C. P. 807	22.78	15.25	12.59	82.56	168.9	3,848	11.84
Co. 281	16.01	16.49	13.92	84.41	189.2	3,029	10.57

[1] Average of 10 replications. Plots of one-fortieth of an acre. Probable error of the difference=±0.69 ton.

TABLE 12.—*Results of plant-cane variety tests on heavy soil (Sharkey clay) on Godchaux plantation, Raceland, La., in 1931*

Variety	Acre yield of cane [1]	Laboratory-mill juice analyses at harvest, Dec. 23			Indicated available 96° sugar at harvest		Cane for 1 ton of sugar
		Brix	Sucrose	Purity	Per ton of cane	Per acre	
	Tons		*Per cent*		*Pounds*	*Pounds*	*Tons*
P. O. J. 213	20.60	14.86	11.96	80.48	158.0	3,255	12.66
C. P. 807	32.40	13.66	10.59	76.06	132.7	4,299	15.07
Co. 281	22.86	15.51	12.05	77.69	155.9	3,564	12.83

[1] Average of 6 replications. Plots of one-fortieth of an acre. Probable error of the difference=±1.14 tons.

TABLE 13.—*Results of plant-cane variety tests on heavy soil (Sharkey clay) on Greenwood plantation, Thibodaux, La., in 1931*

Variety	Acre yield of cane [1]	Laboratory-mill juice analyses at harvest, Dec. 16			Indicated available 96° sugar at harvest		Cane for 1 ton of sugar
		Brix	Sucrose	Purity	Per ton of cane	Per acre	
	Tons		*Per cent*		*Pounds*	*Pounds*	*Tons*
P. O. J. 213	29.07	14.91	11.77	78.94	153.8	4,471	13.00
C. P. 807	39.34	14.32	10.94	76.40	140.2	5,515	14.27
Co. 281	27.45	15.33	11.94	77.89	154.8	4,249	12.92

[1] Average of 6 replications. Plots of one-fortieth of an acre. Probable error of the difference=±1.75 tons.

TABLE 14.—*Results of plant-cane variety tests on heavy soil (Sharkey clay) on Oaklawn plantation, Franklin, La., in 1931*

Variety	Acre yield of cane [1]	Laboratory-mill juice analyses at harvest, Dec. 11			Indicated available 96° sugar at harvest		Cane for 1 ton of sugar
		Brix	Sucrose	Purity	Per ton of cane	Per acre	
	Tons		*Per cent*		*Pounds*	*Pounds*	*Tons*
P. O. J. 213	8.92	14.27	11.26	78.91	147.2	1,313	13.59
C. P. 807	16.69	14.78	11.89	80.45	157.1	2,622	12.73
Co. 281	12.51	15.85	12.75	80.44	168.5	2,108	11.87

[1] Average of 6 replications. Plots of one-fortieth of an acre. Probable error of the difference=±1.46 tons.

TABLE 15.—*Summary of the results of plant-cane tests with important varieties on heavy soil (Sharkey clay) in Louisiana during 1931*

Variety	Houma (Table 10)			Crescent farm (Table 11)			Raceland (Table 12)		
	Acre yield of cane [1]	Indicated yield of available 96° sugar		Acre yield of cane [1]	Indicated yield of available 96° sugar		Acre yield of cane [1]	Indicated yield of available 96° sugar	
		Per ton of cane	Per acre		Per ton of cane	Per acre		Per ton of cane	Per acre
	Tons	*Pounds*	*Pounds*	*Tons*	*Pounds*	*Pounds*	*Tons*	*Pounds*	*Pounds*
P. O. J. 36	20.38	175.4	3,575	-------	-------	-------	-------	-------	-------
P. O. J. 36–M	18.94	176.0	3,333	13.03	180.2	2,348	-------	-------	-------
P. O. J. 213	18.90	187.1	3,536	8.94	187.3	1,674	20.60	158.0	3,255
P. O. J. 234	-------	-------	-------	15.16	208.4	3,159	-------	-------	-------
C. P. 807	26.79	172.7	4,627	22.78	168.9	3,848	32.40	132.7	4,299
Co. 281	18.40	188.9	3,476	16.01	189.2	3,029	22.86	155.9	3,564
Co. 290	28.02	161.0	4,511	-------	-------	-------	-------	-------	-------

Variety	Greenwood (Table 13)			Oaklawn (Table 14)			Average		
	Acre yield of cane [1]	Indicated yield of available 96° sugar		Acre yield of cane [1]	Indicated yield of available 96° sugar		Acre yield of cane	Indicated yield of available 96° sugar	
		Per ton of cane	Per acre		Per ton of cane	Per acre		Per ton of cane	Per acre
	Tons	*Pounds*	*Pounds*	*Tons*	*Pounds*	*Pounds*	*Tons*	*Pounds*	*Pounds*
P. O. J. 213	29.07	153.8	4,471	8.92	147.2	1,313	17.29	164.84	2,850
C. P. 807	39.34	140.2	5,515	16.69	157.1	2,622	27.60	151.52	4,182
Co. 281	27.45	154.8	4,249	12.51	168.5	2,108	19.45	168.89	3,285

[1] The probable error of the difference = ±0.77 ton at Houma, ±0.69 ton at Crescent farm, ±1.14 tons at Raceland, ±1.75 tons at Greenwood, and ±1.46 tons at Oaklawn.

The results bear out previous observations to the effect that C. P. 807 can be successfully grown on the heavy, poorly drained soils of southern Louisiana. Its average yield of 27.6 tons per acre for the five tests with an indicated average yield of 151.52 pounds of sugar per ton of cane is very satisfactory. The average yield of 4,182 pounds of sugar per acre on heavy soils equals the yields usually obtained with P. O. J. varieties under favorable conditions on the well-drained light and mixed soils. In this series of tests the worst results with C. P. 807 were obtained at Raceland (Table 12), where the available sugar per ton of cane was only 132.7 pounds as compared with 158 pounds for P. O. J. 213, and 155.9 pounds for Co. 281. The high yield of cane per acre obtained with C. P. 807 in this test, however, places its yield of sugar per acre considerably in excess of the yields obtained with either P. O. J. 213 or Co. 281. In the other tests C. P. 807 gave yields of sugar per ton of cane ranging from 140.2 to 172.7 pounds, and its performance from the standpoint of cane and sugar per acre was outstandingly superior to that of any other varieties included in the tests.

P. O. J. 213 gave unsatisfactory yields of cane at Crescent farm (Table 11) and Oaklawn (Table 14). At Greenwood (Table 13), although a comparatively gappy stand was obtained, this variety gave a remarkably high average yield of cane per acre with very satisfactory sugar content. At Houma (Table 10), in spite of the

comparatively low observed yield of 18.9 tons of cane per acre, its high yield of sugar per ton of cane of 187.1 pounds brings the yield of sugar per acre to 3,536 pounds.

Co. 281 did not show adaptation comparable to that of C. P. 807. Good yields were obtained at Raceland and Greenwood, but low yields were obtained in all other tests and in particular at Oaklawn, where, as previously mentioned, stands were very adversely affected by severe beetle damage. In the average of the five tests Co. 281 gave an average yield of only 19.45 tons of cane per acre, but its consistently higher sugar content resulted in an average yield of 3,285 pounds of sugar per acre as compared with 4,182 pounds from C. P. 807 and 2,850 pounds from P. O. J. 213.

P. O. J. 36–M in tests on heavy soil of the Sharkey clay type at the United States Sugar Plant Field Station and on Crescent farm, near Houma (Tables 10 and 11), did not respond very favorably, and this variety is probably of questionable value under such soil and drainage conditions.

P. O. J. 36 was included in the heavy soil tests only at the United States Sugar Plant Field Station. (Table 10.) In this test it gave an average yield of cane per acre exceeding that obtained from P. O. J. 36–M by 1.44 tons (a difference which, in view of the probable error of the difference of 0.77 ton, can not be considered as significant) and showed approximately the same yield of sugar per ton of cane. P. O. J. 36 gave a slightly higher yield of sugar per ton of cane than did C. P. 807, 175.4 pounds as compared with 172.7 pounds, but proved inferior in that it gave 6.41 tons less cane per acre and 1,052 pounds less sugar per acre.

Co. 290 in a single experiment (Table 10) gave a yield of cane which did not differ significantly from that obtained from C. P. 807 and in spite of its slightly lower sugar content showed a yield of sugar per acre but slightly under that from C. P. 807.

P. O. J. 234 in one test (Table 11) proved superior to P. O. J. 213 and P. O. J. 36–M. Its yield of cane per acre was significantly higher than that of either P. O. J. 36–M or P. O. J. 213, and its indicated yield of 208.4 pounds of sugar per ton of cane was considerably in excess of the yield of any of the other varieties in the test. Its yield of 3,159 pounds of sugar per acre exceeded that of P. O. J. 36–M by 811 pounds and was almost double the yield obtained with P. O. J. 213.

The results of experiments conducted so far on the heavy, poorly drained soils of the Sharkey clay type indicate that C. P. 807 possesses definite commercial value under such conditions, while the results obtained with P. O. J. 213 indicate the doubtful suitability of that variety. In some of the tests P. O. J. 213 gave very good yields of cane and sugar per acre, but the exceedingly poor results obtained in the other tests render the planting of this variety on this soil type extremely hazardous. Co. 281 and P. O. J. 234 have shown indications of fair suitability from a plant-cane standpoint. Their value under such conditions, however, will depend largely on their stubbling qualities. Co. 290 in a single test afforded exceedingly satisfactory yields of plant cane, but gave yields of sugar per ton of cane and per acre below those obtained with C. P. 807.

GAPS IN PLANT CANE

In an effort to arrive at some of the factors influencing yield differences between varieties, a study was conducted during the month of June, 1931, to determine the extent of gaps in the plant-cane cooperative variety test plots. The results of this investigation are summarized in Table 16.

TABLE 16.—*Gaps in stands of plant cane in cooperative variety tests as determined by studies in June, 1931*

Variety	Percentage of linear row footage in gaps of 18 inches or longer in tests at indicated localities									
	Tests on light soil [1]						Tests on heavy soil [1]			
	Raceland	Greenwood	Midway	Oaklawn	Alma	Average	Raceland	Greenwood	Oaklawn	Average
P. O. J. 36–M	26.90	29.20	14.30	30.90	18.30	23.92	-------	-------	-------	-------
P. O. J. 213	34.20	33.13	44.10	48.30	67.40	45.43	60.90	44.80	57.80	54.50
P. O. J. 234	26.90	11.60	10.30	27.30	15.30	18.28	-------	-------	-------	-------
C. P. 807	6.10	3.45	4.60	20.20	4.70	7.81	26.30	4.50	29.20	20.00
Co. 281	24.30	13.50	9.40	32.90	18.10	19.64	36.40	14.00	38.10	29.50
Co. 290	10.50	29.40	7.40	20.10	11.60	15.80	-------	-------	-------	-------

[1] Light soils consisted of variations of the silty and sandy loam types as compared with heavy soils of the Sharkey clay type.

This study reveals striking differences among varieties with respect to prevalence of gaps. C. P. 807, except at Oaklawn, where the previously mentioned beetle damage had greatly increased the prevalence of gaps, developed almost perfect stands in the light soils consisting of silty or sandy loam of the Yazoo or related types and comparatively satisfactory stands in the heavy soils of the Sharkey clay series. P. O. J. 213 showed unusually high percentages of gaps of 18 inches or longer in all tests, averaging 45.43 per cent in the light soil tests and 54.5 per cent in the heavy soil tests. Red rot was largely responsible for these extensive gaps in P. O. J. 213, and in the Oaklawn test beetle damage was an additional factor.

The gaps in the heavy-soil plots were considerably more extensive than in the tests on light soil, a condition brought about undoubtedly by the difficulty of preparing a satisfactory seed bed under the existing soil conditions. Red-rot damage was observed to be more severe in the heavy soils than in the lighter soils thus further increasing the extent of gaps. The high percentage of gaps in the heavy soils is undoubtedly an important factor in the comparatively low yields obtained.

With such greatly impaired initial stands of cane, it is indeed surprising that P. O. J. 213 produced the tonnages recorded. They were made possible only by the characteristically rapid growth of this variety during the warm, rainy months. The high percentage of gaps in P. O. J. 213, in addition to greatly curtailing the yields of cane, resulted in unusually late suckering in the case of stools bordering long gaps, this undoubtedly resulting in lowering its available sugar content.

FIRST-STUBBLE VARIETY TESTS

During the crop year 1930–31, observations were continued on the first-stubble crop of variety tests, the plant-cane results of which have been given in a previous publication.[5] The results obtained are summarized in Tables 17 to 23, inclusive.

TABLE 17.—*Results of first-stubble variety tests on light soil (Yazoo very fine sandy loam) on Godchaux plantation, Raceland, La., in 1931*

Variety	Acre yield of cane [1]	Laboratory-mill juice analyses at harvest, Nov. 16			Indicated available 96° sugar at harvest		Cane for 1 ton of sugar
		Brix	Sucrose	Purity	Per ton of cane	Per acre	
	Tons		*Per cent*		*Pounds*	*Pounds*	*Tons*
P. O. J. 36–M	23.28	14.94	11.53	77.17	148.7	3,462	13.45
P. O. J. 213	21.22	14.34	11.19	78.03	145.3	3,083	13.76
P. O. J. 234	20.69	15.28	12.20	79.84	160.5	3,321	12.46
C. P. 177	19.83	14.31	10.56	73.79	132.2	2,621	15.13
C. P. 766	30.73	15.58	11.92	76.51	152.8	4,695	13.09
C. P. 807	31.18	15.04	12.07	80.25	159.3	4,967	12.55
Co. 281	22.03	15.26	12.09	79.23	158.3	3,487	12.63

[1] Average of 11 replications. Plots of one-fortieth of an acre. Probable error of the difference= ±1.00 ton.

TABLE 18.—*Results of first-stubble variety tests on light soil (Yazoo very fine sandy loam) on Greenwood plantation, Thibodaux, La., in 1931*

Variety	Acre yield of cane [1]	Laboratory-mill juice analyses at harvest, Nov. 11			Indicated available 96° sugar at harvest		Cane for 1 ton of sugar
		Brix	Sucrose	Purity	Per ton of cane	Per acre	
	Tons		*Per cent*		*Pounds*	*Pounds*	*Tons*
P. O. J. 36–M	14.18	14.63	10.59	72.38	130.9	1,856	15.28
P. O. J. 213	15.18	14.99	11.50	76.72	147.7	2,242	13.54
P. O. J. 234	16.78	15.86	12.08	76.17	154.4	2,591	12.95
C. P. 177	16.56	14.45	10.32	71.42	126.4	2,093	15.82
C. P. 766	25.69	15.40	10.84	70.39	131.3	3,373	15.23
C. P. 807	32.77	14.05	10.45	74.37	131.6	4,313	15.20
Co. 281	16.83	15.68	11.91	75.96	152.0	2,558	13.16

[1] Average of 11 replications. Plots of one-twentieth of an acre. Probable error of the difference=±1.33 tons.

TABLE 19.—*Results of first-stubble variety tests on light soil (Iberia silt loam and related types) on Cypremort plantation, Louisa, La., in 1931*

Variety	Acre yield of cane [a]	Laboratory-mill juice analyses						Indicated available 96° sugar at harvest		Cane for 1 ton of sugar
		Preliminary analyses, Nov. 5			Harvest analyses, Nov. 23					
		Brix	Sucrose	Purity	Brix	Sucrose	Purity	Per ton of cane	Per acre	
	Tons		*Per cent*			*Per cent*		*Pounds*	*Pounds*	*Tons*
P. O. J. 36–M	19.63	15.20	11.83	77.83	16.21	13.53	83.47	182.6	3,584	10.95
P. O. J. 213	18.90	13.91	10.47	75.27	14.79	11.81	79.85	155.4	2,937	12.87
P. O. J. 234	21.59	16.66	13.65	81.93	16.80	14.20	84.52	193.2	4,171	10.35
P. O. J. 2725	10.28	14.41	10.43	72.38	15.10	11.76	77.88	152.4	1,567	13.12
C. P. 177	20.85	13.89	9.82	70.70	14.72	11.34	77.04	146.1	3,046	13.69
C. P. 807	30.15	14.98	11.81	78.84	15.75	12.88	81.78	171.9	5,183	11.63
Co. 281	16.37	15.59	12.19	78.19	16.58	13.91	83.90	188.4	3,084	10.62

[a] Average of 8 replications. Plots of one twenty-fifth of an acre. Probable error of the difference =±1.55 tons.

[5] ARCENEAUX, G., STOKES, I. E., and BISLAND, R. B. Op. cit. (See footnote 3.)

TABLE 20.—*Results of first-stubble variety tests on light soil (Vermilion silt loam [1]) on Caldwell plantation, Erath, La., in 1931*

Variety	Acre yield of cane [2]	Laboratory-mill juice analyses at harvest, Nov. 12			Indicated available 96° sugar at harvest		Cane for 1 ton of sugar
		Brix	Sucrose	Purity	Per ton of cane	Per acre	
	Tons		*Per cent*		*Pounds*	*Pounds*	*Tons*
P. O. J. 36-M	7.72	16.28	12.54	77.02	161.5	1,247	12.38
P. O. J. 213	6.66	15.24	11.81	77.49	152.6	1,016	13.11
P. O. J. 234	7.77	16.48	13.25	80.40	175.1	1,360	11.42
C. P. 177	10.26	16.03	11.86	73.98	148.8	1,527	13.44
C. P. 766	10.53	16.38	12.00	73.26	149.5	1,574	13.38
C. P. 807	14.98	16.13	12.91	80.03	170.1	2,548	11.76
Co. 281	4.37	16.38	12.81	78.20	166.3	727	12.03

[1] Tentative classification.
[2] Average of 9 replications. Plots of one thirty-fifth of an acre. Probable error of the difference = ±1.03 tons.

TABLE 21.—*Results of first-stubble variety tests on light soil at the United States Sugar Plant Field Station, Houma, La., in 1931*

Group and variety	Acre yield of cane [1]	Laboratory-mill juice analyses at harvest, Nov. 23-25			Indicated available 96° sugar at harvest		Cane for 1 ton of sugar
		Brix	Sucrose	Purity	Per ton of cane	Per acre	
Group 1: [2]	*Tons*		*Per cent*		*Pounds*	*Pounds*	*Tons*
P. O. J. 213	25.90	15.59	13.06	83.77	176.6	4,574	11.33
C. P. 177	25.61	14.89	11.40	76.56	146.3	3,747	13.67
C. P. 766	32.61	15.38	11.85	77.05	152.6	4,976	13.11
C. P. 807	34.98	15.26	12.63	82.76	169.6	5,933	11.79
Co. 281	29.09	15.91	13.09	82.27	175.2	5,097	11.42
Group 2: [3]							
P. O. J. 36	25.41	15.38	12.46	81.01	165.3	4,200	12.10
P. O. J. 36-M	27.79	15.72	12.79	81.36	170.2	4,730	11.75
P. O. J. 213	25.19	15.92	13.32	83.67	180.0	4,534	11.11
P. O. J. 234	21.34	16.78	14.21	84.68	193.5	4,129	10.34
C. P. 71-B	22.97	15.94	12.87	80.74	170.5	3,916	11.73

[1] Average of 5 replications. Plots of one-fortieth of an acre. Probable error of the difference: Group 1=±0.67 ton, group 2=±1.86 tons.
[2] On Yazoo silt-loam.
[3] On Yazoo silty clay loam and soil tentatively classified as Crevasse silty clay loam.

TABLE 22.—*Results of first-stubble variety tests on heavy soil at the United States Sugar Plant Field Station, Houma, La., in 1931*

Group and variety	Acre yield of cane [1]	Laboratory-mill juice analyses at harvest, Nov. 16-17			Indicated available 96° sugar at harvest		Cane for 1 ton of sugar
		Brix	Sucrose	Purity	Per ton of cane	Per acre	
Group 1: [2]	*Tons*		*Per cent*		*Pounds*	*Pounds*	*Tons*
P. O. J. 36	26.57	15.17	11.86	78.18	154.1	4,094	12.98
P. O. J. 36-M	28.08	16.02	12.95	80.84	171.6	4,819	11.66
P. O. J. 213	24.83	15.93	13.17	82.67	176.8	4,390	11.31
P. O. J. 234	24.50	16.69	13.80	82.68	185.5	4,545	10.78
C. P. 71-B	20.49	15.89	12.54	78.92	163.9	3,358	12.20
Group 2: [3]							
P. O. J. 213	21.63	16.36	13.68	83.61	184.9	3,999	10.82
C. P. 177	19.68	15.39	11.87	77.12	153.0	3,011	13.07
C. P. 766	29.26	15.92	12.30	77.26	158.7	4,643	12.60
C. P. 807	34.25	15.35	12.49	81.36	166.2	5,692	12.03
Co. 281	25.37	16.65	13.73	82.46	184.2	4,673	10.86

[1] Average of 5 replications. Plots of one-fortieth of an acre. Probable error of the difference: Group 1=±1.36 tons; group 2=±1.42 tons.
[2] On largely Sharkey clay with small body of Crevasse silty clay loam.
[3] On Sharkey clay. The soil on which these tests were conducted was slightly heavier, lower, and consequently less effectively drained than the soil on which group 1 tests were conducted.

TABLE 23.—*Summary of results of first-stubble tests with important varieties of sugarcane in Louisiana during 1931*

Variety	Raceland; light soil [1] (Table 17)			Greenwood; light soil [1] (Table 18)			Cypremort; light soil [1] (Table 19)			Erath; light soil [1] (Table 20)		
	Acre yield of cane [2]	Indicated yield of available 96° sugar		Acre yield of cane [2]	Indicated yield of available 96° sugar		Acre yield of cane [2]	Indicated yield of available 96° sugar		Acre yield of cane [2]	Indicated yield of available 96° sugar	
		Per ton of cane	Per acre		Per ton of cane	Per acre		Per ton of cane	Per acre		Per ton of cane	Per acre
	Tons	*Lbs.*	*Lbs.*	*Tons*	*Lbs.*	*Lbs.*	*Tons*	*Lbs.*	*Lbs.*	*Tons*	*Lbs.*	*Lbs.*
P. O. J. 36–M	23.28	148.7	3,462	14.18	130.9	1,856	19.63	182.6	3,584	7.72	161.5	1,247
P. O. J. 213	21.22	145.3	3,083	15.18	147.7	2,242	18.90	155.4	2,937	6.66	152.6	1,016
P. O. J. 234	20.69	160.5	3,321	16.78	154.4	2,591	21.59	193.2	4,171	7.77	175.1	1,360
C. P. 177	19.83	132.2	2,621	16.56	126.4	2,093	20.85	146.1	3,046	10.26	148.8	1,527
C. P. 766	30.73	152.8	4,695	25.69	131.3	3,373	-------	-------	-------	10.53	149.5	1,574
C. P. 807	31.18	159.3	4,967	32.77	131.6	4,313	30.15	171.9	5,183	14.98	170.1	2,548
Co. 281	22.03	158.3	3,487	16.83	152.0	2,558	16.37	188.4	3,084	4.37	166.3	727

Variety	Houma; light soil [1] (Table 21)			Houma; heavy soil [1] (Table 22)			Average		
	Acre yield of cane	Indicated yield of available 96° sugar		Acre yield of cane	Indicated yield of available 96° sugar		Acre yield of cane	Indicated yield of available 96° sugar	
		Per ton of cane	Per acre		Per ton of cane	Per acre		Per ton of cane	Per acre
	Tons	*Pounds*	*Pounds*	*Tons*	*Pounds*	*Pounds*	*Tons*	*Pounds*	*Pounds*
P. O. J. 36	25.41	165.3	4,200	26.57	154.1	4,094	-------	-------	-------
P. O. J. 36–M	27.79	170.2	4,730	28.08	171.6	4,819	20.11	163.25	3,283
P. O. J. 213	25.54	178.3	4,554	23.23	180.5	4,194	18.45	162.82	3,004
P. O. J. 234	21.34	193.5	4,129	24.50	185.5	4,545	18.78	178.54	3,353
C. P. 177	25.61	146.3	3,747	19.68	153.0	3,011	18.80	142.23	2,674
C. P. 766	32.61	152.6	4,976	29.26	158.7	4,643	25.76	149.53	3,852
C. P. 807	34.98	169.6	5,933	34.25	166.2	5,692	29.72	160.60	4,773
Co. 281	29.09	175.2	5,097	25.37	184.2	4,673	19.01	172.07	3,271

[1] Soil type given in previous tables.
[2] The probable error of the difference=±1 ton at Raceland, ±1.33 tons at Greenwood, ±1.55 tons at Cypremort, and ±1.03 tons at Erath.

Owing to its comparatively inferior performance under Louisiana conditions, as previously mentioned, P. O. J. 36, was omitted in all except two of the tests. (Tables 21 and 22.) In these two tests, while its average yields of cane per acre were not significantly lower than corresponding yields obtained with P. O. J. 36–M, its indicated yields of sugar per ton of cane were 4.9 and 17.5 pounds, respectively, below corresponding yields obtained with P. O. J. 36–M. In these two tests it gave an average yield of sugar per acre of 627 pounds below that of P. O. J. 36–M.

P. O. J. 36–M gave relatively good yields of cane of satisfactory commercial value. It approximately equaled P. O. J. 213 in yield of sugar per ton of cane in the average of the six tests and showed a yield of cane per acre 1.66 tons higher than that from P. O. J. 213. As observed in previous years, the performance of P. O. J. 36–M in comparison with P. O. J. 213 was more satisfactory in the western parishes, represented by the Cypremort and Erath test fields, where, in addition to giving higher yields per acre, the cane was of a quality apparently superior to that of P. O. J. 213. In the eastern parishes,

as shown by the results of tests at Raceland and Houma (Tables 17, 21, and 22), P. O. J. 36–M was superior to P. O. J. 213 in yields of cane per acre, but showed in general a slightly lower available sugar content. It surpassed P. O. J. 213 in yield of sugar per acre by 379 pounds at Raceland on light soil (Yazoo very fine sandy loam), 176 pounds at Houma on mixed soil (Yazoo silt loam and silty clay loam and Crevasse silty clay loam), and 429 pounds at Houma on heavy soil (largely Sharkey clay). At Greenwood (Table 18), on the other hand, the yield of sugar per acre on light soil (Yazoo very fine sandy loam) was less from P. O. J. 36–M than that from P. O. J. 213 by 386 pounds. The difference was due largely to the lower yield of sugar per ton of cane.

Owing mainly to unsatisfactory stands of cane, P. O. J. 213 fell considerably short of its previous record in cane production, though maintaining its previously established place in point of indicated yield of sugar per ton of cane. The low yields of cane obtained with this variety placed its average yield of cane and sugar per acre as first stubble below the average yield obtained with P. O. J. 36–M.

P. O. J. 234 afforded yields of cane equivalent to those obtained with P. O. J. 36–M and yields of sugar per ton of cane appreciably greater than those from P. O. J. 36–M or from any other varieties included in the trials. Its average yield of 178.54 pounds of sugar per ton of cane places its average yield of sugar per acre for all tests summarized in Table 23 at 3,353 pounds, which is 70 pounds in excess of the average yield from P. O. J. 36–M.

The unsatisfactory results obtained with C. P. 177 in these and all previous tests definitely prove that it is unsuitable for commercial cultivation under Louisiana conditions.

C. P. 766 was satisfactory in yields of cane in every case and gave indicated yields of sugar per ton of cane and per acre consistently higher than corresponding yields obtained with C. P. 177. This variety, however, while possessing many of the good qualities of C. P. 807, did not in any case equal the latter in either yield of cane per acre or yield of sugar per ton of cane.

C. P. 807 produced very high yields of cane per acre and an indicated yield of sugar per ton of cane comparing favorably with, and in numerous instances exceeding, that from P. O. J. 36–M and P. O. J. 213. The results obtained with this variety at Cypremort and Erath (Tables 19 and 20) indicate adaptation to conditions in the western parishes. In these two tests it was very satisfactory in yields of cane under the prevailing conditions, with a yield of sugar per ton of cane in excess of 170 pounds in each case. At Erath, where, because of abnormally cool spring weather and a severe drought during the summer months, cane of all other varieties gave very unsatisfactory results as first stubble, C. P. 807 gave a yield of 2,548 pounds of sugar per acre. At Cypremort, under more favorable conditions, C. P. 807 yielded at the rate of 30.15 tons of cane per acre, with a yield of 5,183 pounds of sugar per acre, exceeding in yield of sugar per acre the next highest variety, P. O. J. 234, by over 1,000 pounds. Comparatively satisfactory results were obtained with C. P. 807 in all other tests. At Greenwood its yield of available sugar per ton of cane of 131.6 pounds was disappointing, although slightly higher than the corresponding yield from P. O. J. 36–M.

Co. 281 gave an average yield of cane per acre of about a ton lower than the average yield from P. O. J. 36–M, but its consistently higher yield of available sugar resulted in a calculated average yield of sugar approximately equal to that from P. O. J. 36–M. In yield of sugar per ton of cane, Co. 281, while not so high as P. O. J. 234, proved superior to P. O. J. 213 and C. P. 807. It outyielded P. O. J. 213 in pounds of sugar per acre in all trials except the one at Erath (Table 20), but as a result of lower yields of cane per acre it gave yields of sugar per acre ranging from 836 to 2,099 pounds lower than the yields from C. P. 807. In the eastern parishes (Tables 17, 18, 21, and 22) Co. 281 gave results equal to, or slightly better than those from P. O. J. 36–M, but in the western parishes it gave distinctly inferior results. Although it gave a slightly higher yield of sugar per ton of cane its much lower yield of cane per acre resulted in yields of sugar per acre in the western parishes 500 pounds below the yields from P. O. J. 36–M.

In summarizing the results of the first-year stubble tests, it is found that P. O. J. 213, in comparison with other commercially cultivated varieties, was considerably below its usual performance in yield of cane per acre, owing to the damaging effect of red rot, which resulted in very gappy stands of this variety. P. O. J. 36–M proved generally satisfactory in all sections, particularly in the western parishes, as shown by the results of tests at Cypremort and Erath. In the average of all first-year stubble tests it surpassed P. O. J. 213 in yield of cane and yield of sugar per acre. In two comparative tests P. O. J. 36 again was inferior to P. O. J. 36–M in yield of sugar per ton of cane and per acre. P. O. J. 234 gave satisfactory yields of cane in all tests, and, owing to its characteristically high sugar content, in the average of all first-stubble tests it produced a higher yield of sugar per acre than either P. O. J. 36–M or P. O. J. 213; in three of the six tests it gave more sugar per acre than P. O. J. 36–M and in five of them more than P. O. J. 213. The results of these and previous tests with C. P. 177 indicate that the variety is not suitable for commercial cultivation in Louisiana. C. P. 766, while possessing many of the good qualities of C. P. 807, proved inferior to the latter in yield of cane per acre and available sugar per ton of cane. C. P. 807 produced very high yields of cane with satisfactory sugar content in all tests, and in the individual tests it gave yields of sugar per acre varying from 873 to 1,722 pounds more than the yield from the highest-yielding P. O. J. variety and from 836 to 2,099 pounds more than Co. 281. In the average of all tests it outyielded the highest P. O. J. variety by 1,420 pounds and Co. 281 by 1,502 pounds. The excellent performance of this variety at Cypremort and Erath was noteworthy. Co. 281 continued to give good results in the eastern parishes. Corroborating the evidence of previous experiments, this variety did not show special adaptation to conditions in the western parishes, as shown by the results of tests conducted at Cypremort and Erath.

SECOND-STUBBLE VARIETY TESTS

Results of the second-year stubble variety tests are given in Tables 24 to 29, inclusive.

TABLE 24.—*Results of second-stubble variety tests on light soil (Yazoo very fine sandy loam) on Godchaux plantation, Raceland, La., in 1931*

Variety	Acre yield of cane [1]	Laboratory-mill juice analyses at harvest, Nov. 16			Indicated available 96° sugar at harvest		Cane for 1 ton of sugar
		Brix	Sucrose	Purity	Per ton of cane	Per acre	
	Tons		*Per cent*		*Pounds*	*Pounds*	*Tons*
P. O. J. 36	16.16	15.19	12.01	79.06	157.1	2,539	12.73
P. O. J. 36-M	16.06	15.45	12.29	79.55	161.4	2,592	12.39
P. O. J. 213	15.00	15.11	12.20	80.74	161.5	2,422	12.38
P. O. J. 234	10.27	15.73	12.76	81.12	169.4	1,740	11.81
C. P. 807	28.54	15.27	12.33	80.75	163.4	4,663	12.24
Co. 281	16.89	16.14	13.15	81.47	175.1	2,957	11.42

[1] Average of 11 replications. Plots of one-fortieth of an acre. Probable error of the difference = ±0.79 ton.

TABLE 25.—*Results of second-stubble variety tests on light soil (Yazoo very fine sandy loam) on Greenwood plantation, Thibodaux, La., in 1931*

Variety	Acre yield of cane [1]	Laboratory-mill juice analyses at harvest, Nov. 10			Indicated available 96° sugar at harvest		Cane for 1 ton of sugar
		Brix	Sucrose	Purity	Per ton of cane	Per acre	
	Tons		*Per cent*		*Pounds*	*Pounds*	*Tons*
P. O. J. 36	26.97	13.78	9.83	71.33	120.3	3,244	16.63
P. O. J. 36-M	25.10	13.59	9.47	69.68	114.0	2,861	17.54
P. O. J. 213	24.47	13.73	10.13	73.78	126.9	3,105	15.76
P. O. J. 234	18.49	14.85	11.26	75.82	143.6	2,655	13.93
P. O. J. 2725	18.35	12.67	8.13	64.17	91.6	1,681	21.83
C. P. 177	16.15	14.12	9.93	70.32	120.3	1,943	16.62

[1] Average of 6 replications. Plots of one-fortieth of an acre. Probable error of the difference = ±1.35 tons.

TABLE 26.—*Results of second-stubble variety tests on light soil (Yazoo silt loam with slight interlacing of Sharkey silt loam) at the United States Sugar Plant Field Station, Houma, La., in 1931*

Variety	Acre yield of cane [1]	Laboratory-mill juice analyses at harvest, Nov. 12			Indicated available 96° sugar at harvest		Cane for 1 ton of sugar
		Brix	Sucrose	Purity	Per ton of cane	Per acre	
	Tons		*Per cent*		*Pounds*	*Pounds*	*Tons*
P. O. J. 36	26.48	15.19	11.66	76.76	149.8	3,967	13.35
P. O. J. 36-M	24.65	15.03	11.35	75.51	144.3	3,557	13.86
P. O. J. 213	24.31	15.64	12.52	80.05	165.0	4,011	12.12
C. P. 177	19.30	15.17	11.30	74.48	142.4	2,748	14.04
C. P. 807	36.00	15.08	11.79	78.18	153.2	5,515	13.05
Co. 281	23.47	15.99	12.61	78.86	164.7	3,866	12.14

[1] Average of 6 replications. Plots of one-fortieth of an acre. Probable error of the difference = ±1.07 tons.

TABLE 27.—*Results of second-stubble variety tests on heavy soil (Crevasse silty clay loam) at the United States Sugar Plant Field Station, Houma, La., in 1931*

Variety	Acre yield of cane [1]	Laboratory-mill juice analyses at harvest, Nov. 9			Indicated available 96° sugar at harvest		Cane for 1 ton of sugar
		Brix	Sucrose	Purity	Per ton of cane	Per acre	
	Tons		*Per cent*		*Pounds*	*Pounds*	*Tons*
P. O. J. 36–M	25.50	15.02	11.55	76.89	148.6	3,789	13.46
P. O. J. 213	23.65	14.97	11.87	79.29	155.5	3,678	12.86
C. P. 177	23.45	14.74	11.11	75.37	141.2	3,311	14.16
C. P. 807	35.15	14.51	11.34	78.15	147.3	5,178	13.58
Co. 281	22.92	15.44	11.98	77.59	155.0	3,553	12.90

[1] Average of 4 replications. Plots of one-fortieth of an acre. Probable error of the difference = ±1.55 tons.

TABLE 28.—*Results of second-stubble variety tests on mixed soil (Crevasse silty clay loam) at the United States Sugar Plant Field Station, Houma, La., in 1931*

Variety	Acre yield of cane [1]	Laboratory-mill juice analyses at harvest, Nov. 10			Indicated available 96° sugar at harvest		Cane for 1 ton of sugar
		Brix	Sucrose	Purity	Per ton of cane	Per acre	
	Tons		*Per cent*		*Pounds*	*Pounds*	*Tons*
P. O. J. 213	11.93	15.28	12.41	81.21	164.9	1,967	12.13
P. O. J. 2354	13.34	14.69	11.53	78.48	150.3	2,005	13.31
P. O. J. 2878	11.92	14.90	11.02	73.95	138.2	1,647	14.47
C. P. 130	.40	15.41	12.25	79.49	160.7	64	12.45
C. P. 766	27.89	16.12	12.93	80.21	170.6	4,758	11.72
C. P. 71–B	1.80	16.43	13.41	81.61	178.8	322	11.19

[1] Average of 4 replications. Plots of one-fortieth of an acre. Probable error of the difference = ±2.14 tons.

TABLE 29.—*Summary of second-stubble tests with important varieties of sugarcane in Louisiana during 1931*

Variety	Raceland; light soil [1] (Table 24)			Greenwood; light soil [1] (Table 25)			Houma; light soil [1] (Table 26)		
	Acre yield of cane [2]	Indicated yield of available 96° sugar		Acre yield of cane [2]	Indicated yield of available 96° sugar		Acre yield of cane [2]	Indicated yield of available 96° sugar	
		Per ton of cane	Per acre		Per ton of cane	Per acre		Per ton of cane	Per acre
	Tons	*Pounds*	*Pounds*	*Tons*	*Pounds*	*Pounds*	*Tons*	*Pounds*	*Pounds*
P. O. J. 36	16.16	157.1	2,539	26.97	120.3	3,244	26.48	149.8	3,967
P. O. J. 36–M	16.06	161.4	2,592	25.10	114.0	2,861	24.65	144.3	3,557
P. O. J. 213	15.00	161.5	2,422	24.47	126.9	3,105	24.31	165.0	4,011
P. O. J. 234	10.27	169.4	1,740	18.49	143.6	2,655	-------	-------	-------
C. P. 177	-------	-------	-------	16.15	120.3	1,943	19.30	142.4	2,748
C. P. 807	28.54	163.4	4,663	-------	-------	-------	36.00	153.2	5,515
Co. 281	16.89	175.1	2,957	-------	-------	-------	23.47	164.7	3,866

[1] Soil type given in previous tables.
[2] The probable error of the difference = ±0.79 ton at Raceland, ±1.35 tons at Greenwood, ±1.07 tons at Houma on light soil, and ±1.55 tons at Houma on heavy soil.

TABLE 29.—*Summary of second-stubble tests with important varieties of sugarcane in Louisiana during 1931*—Continued.

Variety	Houma; heavy soil [1] (Table 27)			Average [3]		
	Acre yield of cane [2]	Indicated yield of available 96° sugar		Acre yield of cane [2]	Indicated yield of available 96° sugar	
		Per ton of cane	Per acre		Per ton of cane	Per acre
	Tons	*Pounds*	*Pounds*	*Tons*	*Pounds*	*Pounds*
P. O. J. 36				23.20	140.09	3,250
P. O. J. 36–M	25.50	148.6	3,789	22.83	140.20	3,200
P. O. J. 213	23.65	155.5	3,678	21.86	151.14	3,304
P. O. J. 234				14.38	152.78	2,197
C. P. 177	23.45	141.2	3,311	19.63	135.86	2,667
C. P. 807	35.15	147.3	5,178	33.23	154.63	5,119
Co. 281	22.92	155.0	3,553	21.09	164.01	3,459

[1] Soil type given in previous tables.
[2] The probable error of the difference =±0.79 ton at Raceland, ±1.35 tons at Greenwood, ±1.07 tons at Houma on light soil, and ±1.55 tons at Houma on heavy soil.
[3] P. O. J. 213 and P. O. J. 36–M averages only ones comparable, since other varieties were not represented in all tests.

P. O. J. 213 gave yields of cane per acre consistently lower than corresponding yields from P. O. J. 36–M, but gave considerably higher yields of sugar per ton of cane in 3 of the 4 tests in which the 2 varieties appeared. The average yield of sugar per acre of 3,304 pounds obtained from P. O. J. 213 in the four tests exceeded the corresponding yield obtained from P. O. J. 36–M by 104 pounds. In comparing results obtained with P. O. J. 36 and P. O. J. 36–M, slightly lower yields of cane were obtained from P. O. J. 36–M. Although in no single experiment does this difference reach proportions of statistical significance, the fact that in each of the three tests, including both of these varieties, the yield of cane per acre from P. O. J. 36–M was slightly under the corresponding yield from P. O. J. 36 gives evidence of the slightly inferior stubbling qualities of P. O. J. 36–M, which have been rather consistently manifested in cases where the cane has been allowed to grow through the second stubble year. In the absence of the usual difference in yield of sugar per ton of cane in favor of P. O. J. 36–M, P. O. J. 36 showed on the average a higher yield of sugar per acre, although at Raceland the yield of sugar per acre was slightly in favor of P. O. J. 36–M.

P. O. J. 234 in two tests (Tables 24 and 25) demonstrated its comparatively weak stubbling qualities and afforded yields of cane significantly lower than those obtained from any of the other P. O. J. varieties, which, in spite of its higher yields of available sugar per ton of cane, resulted in yields of sugar per acre below the yields obtained from the other P. O. J. varieties.

C. P. 177 gave generally poor yields of cane per acre and sugar per ton of cane and lower yields of sugar per acre than any of the commercial varieties. These results confirm other results regarding the inferior qualities of this variety.

C. P. 807 significantly outyielded all other varieties in each of the three trials (Tables 24, 26, and 27), yielding from 9.5 to 11.7 tons more cane per acre and from 1,389 to 1,706 pounds more sugar per acre than its closest competitor. In one of the trials its yield of sugar per ton of cane was higher than the yield from P. O. J. 213, but the

average of the three trials shows 154.63 pounds from C. P. 807 as compared with 160.70 pounds from P. O. J. 213, and 151.43 pounds from P. O. J. 36–M.

Co. 281 gave yields of cane which did not differ significantly from those obtained from P. O. J. 213 and P. O. J. 36–M. It gave a better average yield of sugar per ton of cane than P. O. J. 213 and P. O. J. 36–M, but in yield of sugar per acre it was not definitely superior to those varieties in spite of the fact that the average for the three trials is in its favor.

Results of second-stubble tests with P. O. J. 2878, P. O. J. 2354, and several C. P. seedlings in comparison with P. O. J. 213 are given in Table 28. None of these, with the exception of C. P. 766, which more extensive tests have shown to be definitely inferior to C. P. 807, show great promise as commercial varieties.

THIRD-STUBBLE VARIETY TESTS

Observations were continued during the crop year 1930–31 on the third-year stubble crop of the variety tests at the Houma station. From the results given in Table 30 it will be observed that, while P. O. J. 36–M, P. O. J. 36, and C. P. 177 gave very unsatisfactory yields of cane and sugar per acre, C. P. 807 and Co. 281 afforded yields of cane per acre fully justifying the cultivation of these two varieties during the third stubble year. The yields of cane of C. P. 807 and Co. 281 did not differ significantly from the corresponding yields obtained from the second-stubble crop; in fact, C. P. 807 showed a slight increase in yield of cane as compared with the average of the second-stubble yields. While the indicated yields of sugar per ton of cane in all the varieties were unusually low, largely because the tests were made from cane that was harvested very early, it is believed that the yield of 102.1 pounds of sugar from C. P. 807 and 115 pounds from Co. 281 indicates that under favorable seasonal conditions a third-stubble crop of these varieties, if harvested at a later date, would prove profitable.

TABLE 30.—*Results of third-stubble variety tests on light soil (Yazoo silt loam) at the United States Sugar Plant Field Station, Houma, La., in 1931*

Variety	Acre yield of cane [1]	Laboratory-mill juice analyses at harvest, Oct. 26			Indicated available 96° sugar at harvest		Cane for 1 ton of sugar
		Brix	Sucrose	Purity	Per ton of cane	Per acre	
	Tons		*Per cent*		*Pounds*	*Pounds*	*Tons*
P.O.J. 36	11.27	12.20	8.18	67.05	95.5	1,076	20.94
P.O.J. 36–M	8.27	12.85	8.94	69.57	107.4	888	18.62
C.P. 177	12.48	11.81	7.18	60.79	77.0	961	25.97
C.P. 807	33.86	12.32	8.53	69.24	102.1	3,457	19.59
Co. 281	22.71	13.41	9.47	70.62	115.0	2,612	17.39

[1] Average of five replications. Plots of one-fortieth of an acre. Probable error of the difference=±1.99 tons.

Table 31 shows the yields of cane and sugar per acre obtained from P. O. J. 36, P. O. J. 36–M, C. P. 807, and Co. 281 during the 4-year period over which this test extended and gives the computed percentage values of the cane and sugar yields of each stubble crop in terms of the yields obtained from the corresponding plant-cane crop. It will be observed that with P. O. J. 36 and P. O. J. 36–M there has been a gradual drop in yield of cane with each successive

crop, with the result that during the third stubble year yields of definitely uneconomical value were obtained. The drop in the case of P. O. J. 36–M was relatively greater than with P. O. J. 36 in each stubble crop, particularly in the third-stubble crop. P. O. J. 36–M, while affording yields of cane per acre not significantly different from corresponding yields obtained with P. O. J. 36, gave a yield of sugar per acre in the course of four successive crops exceeding that from P. O. J. 36 by 1,931 pounds.

TABLE 31.—*Summary of data for four successive crops obtained in comparative variety tests at the United States Sugar Plant Field Station, Houma, La.*

Variety	Crop and date of harvesting									
	Plant cane,[1] harvested Dec. 13, 1928		First stubble,[2] harvested Nov. 8, 1929				Second stubble,[3] harvested Oct. 22, 1930			
	Acre yield of cane	Indicated yield of available 96° sugar per acre	Acre yield of cane	Indicated yield of available 96° sugar per acre	Cane yield (percentage of plant-cane crop)	Sugar yield (percentage of plant-cane crop)	Acre yield of cane	Indicated yield of available 96° sugar per acre	Cane yield (percentage of plant-cane crop)	Sugar yield (percentage of plant-cane crop)
	Tons	*Pounds*	*Tons*	*Pounds*	*Per cent*	*Per cent*	*Tons*	*Pounds*	*Per cent*	*Per cent*
P. O. J. 36	35.48	3,945	32.34	5,630	91.15	142.71	23.77	2,845	67.00	72.12
P. O. J. 36–M	37.54	4,895	33.71	6,401	89.80	130.77	24.55	3,243	65.40	66.25
C. P. 807	50.86	6,485	42.83	7,003	84.21	107.99	32.92	3,996	64.73	61.62
Co. 281	25.31	3,318	32.66	6,274	129.04	189.09	24.12	3,025	95.30	91.17

Variety	Crop and date of harvesting					
	Third stubble,[4] harvested Oct. 26, 1931				Total of four crops	
	Acre yield of cane	Indicated yield of available 96° sugar per acre	Cane yield (percentage of plant-cane crop)	Sugar yield (percentage of plant-cane crop)	Acre yield of cane	Indicated yield of available 96° sugar per acre
	Tons	*Pounds*	*Per cent*	*Per cent*	*Tons*	*Pounds*
P. O. J. 36	11.27	1,076	31.77	27.28	102.86	13,496
P. O. J. 36–M	8.27	888	22.03	18.14	104.07	15,427
C. P. 807	33.86	3,457	66.57	53.31	160.47	20,941
Co. 281	22.71	2,612	89.73	78.72	104.80	15,229

[1] ARCENEAUX, G., and STEVENS, F. D. Op. cit. (Table 2.)
[2] ARCENEAUX, G., and GIBBENS, R. T. Op. cit. (Table 18.)
[3] ARCENEAUX, G., STOKES, I. E., and BISLAND, R. B. Op. cit. (Table 18.)
[4] Table 30 in this publication.

In the case of C. P. 807, while the relative drop in yield of cane for the first two stubble crops approached nearly the proportions observed with P. O. J. 36 and P. O. J. 36–M, a corresponding drop was not shown in the third-stubble crop, which gave a yield of 33.86 tons of cane per acre.

Owing undoubtedly to the very thin stand of plant cane obtained, Co. 281 showed a marked increase in yield from the first-stubble crop and dropped off in the second and third stubble crops. The yield of cane obtained from the third-stubble crop, however, was 22.71 tons, or over 89 per cent of that obtained from the plant-cane crop. The thin stand of plant cane was undoubtedly due to thin planting, which was necessary on account of the small quantity of seed cane available.

These data afford strong evidence that both Co. 281 and C. P. 807 possess stubbling qualities considerably superior to those of P. O. J. 36 or P. O. J. 36–M. Under the usual plantation conditions in Louisiana a satisfactory third stubble is seldom realized. The results

obtained from P. O. J. 36 and P. O. J. 36–M are rather characteristic of those usually obtained with a third-stubble crop of P. O. J. varieties. In many instances even second stubble does not afford stands of cane sufficiently thick to warrant further cultivation. Since the operation of preparing the land and planting the cane is a comparatively expensive one, the desirability of extending the number of crops from a given planting is of great importance. If, as indicated by the results of this test, C. P. 807 and Co. 281 can be depended on to give four satisfactory crops from a single planting as compared with an expectancy of less than three with the P. O. J. varieties, a considerable advance toward more economical production will be realized.

MILL TESTS

During the harvesting season an attempt was made to concentrate as much as possible of the available cane of the Co. 281 and C. P. 807 varieties at Southdown and Raceland factories for milling observations. The results of these mill tests are given in Table 32. While in general it has been found extremely difficult to obtain highly accurate experimental data at commercial factories, because of the large-scale basis of operation, the results of these carefully conducted tests afford valuable information regarding the milling properties of the two newly released varieties. Co. 281 in these and all previous tests has shown milling properties approximately equal to those of the P. O. J. varieties now being cultivated in Louisiana. C. P. 807, owing to its characteristically higher fiber content, proved a somewhat harder cane to grind and resulted in slowing down the milling operation approximately 10 per cent in comparison with the P. O. J. varieties.

TABLE 32.—*Summarized results of mill tests conducted during the 1931–32 season*

Factory	Date	Variety	Quantity of cane milled	Rate of milling per hour	Normal extraction	Sucrose extraction	Fiber in cane	Indicated available 96° sugar per ton of cane
			Tons	*Tons*	*Per cent*	*Per cent*	*Per cent*	*Pounds*
Southdown	Nov. 27, 1931	C. P. 807 (first stubble)	164. 22	82. 11	--------	--------	--------	141. 56
	do	Co. 281 (first stubble)	82. 72	90. 24	--------	--------	--------	171. 55
	Dec. 22, 1931	Co. 281 (plant cane)	183. 27	--------	--------	--------	--------	[1] 151. 35
	do	C. P. 807 (plant cane)	62. 01	--------	--------	--------	--------	[1] 160. 96
Raceland	Dec. 31, 1931 to Jan. 2, 1932	P. O. J. 36–M (plant cane).	4, 058. 00	55. 4	76. 10	92. 08	13. 35	160. 00
	Jan. 1, 1932	C. P. 807 (plant cane)	369. 00	50. 0	72. 49	90. 34	15. 37	160. 81

[1] Determined from calculated normal juice, using Winter-Carp formula; assumed normal extraction=78 per cent; B. H. E. number=100 per cent.

The difficulty in grinding C. P. 807 was undoubtedly due partly to the fact that in this and all other tests the mill setting was the same as for P. O. J. varieties, and it is reasonable to expect that had the mills been adjusted for milling C. P. 807 more satisfactory rates of milling would have resulted. At Southdown it was found necessary to modify somewhat the clarification process in order to obtain the best results. At a reaction approximately neutral, the juice clarified satisfactorily.

It must be borne in mind that the satisfactory handling of any new variety may necessitate modifications in the procedure followed with

other varieties, such as had to be made in Louisiana on the introduction of the P. O. J. varieties. The main problem in connection with the milling of C. P. 807 appears to be a difference in fiber content, and it is believed that when mill settings have been properly adjusted to take care of this difference entirely satisfactory results will be obtained. The indicated yield of sugar per ton of cane obtained in factory tests was satisfactory in the case of each of the new varieties. At Raceland C. P. 807 gave a yield of 160.81 pounds of sugar per ton of cane, which was equal to that obtained with P. O. J. 36–M, in spite of the fact that a much lower normal extraction was obtained with C. P. 807.

SUMMARY AND CONCLUSION

In this circular are summarized results obtained in comparative variety tests with sugarcanes in Louisiana during the crop year 1930–31. The most striking fact brought out by the results of these tests is that the heretofore highly satisfactory variety P. O. J. 213 has shown unmistakable signs of decreased production due to the damaging effects of red rot, which were particularly pronounced in plant cane. The comparative results obtained with P. O. J. 213 in these tests were perhaps more satisfactory than results obtained generally on plantations, because of the fact that the experimental plantings were made during late September and early October, a period which experiments have shown to be comparatively favorable for planting this variety. The most disastrous results were obtained with plantings made during the spring. In a few such instances whole "cuts" of P. O. J. 213 plant cane had to be plowed out on account of insufficient stands. As previously pointed out, weather conditions during the spring of 1931 were extremely conducive to deterioration by red rot, and it is likely that under normal conditions much better results will be obtained with P. O. J. 213—results possibly very similar to those obtained in previous years. This serious pathological weakness, however, greatly reduces the value of P. O. J. 213 for cultivation in Louisiana, since conditions such as prevailed during the spring of 1931 are not infrequently encountered. It would seem that the danger of these possibly serious failures in stands is too great to warrant the continued extensive planting of this variety. However, the situation brought about as a result of this demonstrated weakness of P. O. J. 213 is not considered an extremely serious one. Since the widespread acceptance by Louisiana growers of P. O. J. 213 as the standard variety, other varieties, namely, P. O. J. 36–M, Co. 281, and C. P. 807, have, as a result of extensive plantation trials, proved superior in several important respects to P. O. J. 213 at its best. These undoubtedly would have been extensively substituted for P. O. J. 213 even though the red-rot situation in connection with it had not arisen.

P. O. J. 234 continues to lead all other released varieties in yield of sugar per ton of cane, and it appears highly desirable to devote a certain port on of the acreage to this variety in order to have cane of commercial value available for early grinding. This variety, although a comparatively weak stubbler, has shown a rather extensive range of adaptation to conditions and has proved comparatively resistant to red rot.

P. O. J. 36–M has continued to give good results and to demonstrate, in general, superiority to P. O. J. 36. This variety appears to

be comparatively better adapted for cultivation in the western than in the eastern parishes.

C. P. 807 gave very high yields of cane under all usual soil and drainage conditions and has demonstrated its commercial value for cultivation in the poorly drained heavy soils consisting of Sharkey clay or related types. This variety has several unfavorable qualities, among which may be mentioned (1) its characteristic recumbent growth, rendering difficult the harvesting operations and probably increasing the hauling costs somewhat, (2) its comparatively high fiber content, and (3) its closely adhering leaf sheath, rendering more difficult the "stripping" operation. On the other hand, its favorable qualities, which include its unusual vigor, as manifested by its high yields of cane and characteristic strong stubbling quality, its satisfactory sugar content, its apparent immunity from the mosaic disease, and its resistance to red rot under field conditions, render it a variety of important commercial value. In the eastern parishes, where a considerable portion of the agricultural area consists of heavy, poorly drained clay soils (Sharkey clay or related types), it will probably be found advantageous to concentrate the planting of C. P. 807 on these soils. In the western parishes, where C. P. 807 has shown comparatively higher indicated yields of sugar per ton of cane and where a much smaller percentage of the cultivated area consists of heavy soils, the cultivation of this variety can probably be extended to the lighter soils, consisting of silt and clay loam (Yazoo series and related types), without giving it undue prominence in the planting program.

Co. 281 outyielded all P. O. J. varieties except P. O. J. 234 in yield of sugar per ton of cane. This variety, however, has given comparatively low yields of cane in the western parishes, and its extensive cultivation should probably be limited to the eastern section, in which the results indicate that it can be advantageously grown on a considerable portion of the light and mixed soils previously devoted to the cultivation of P. O. J. 213. In determining the proportion of the cultivated area to be planted in Co. 281, its brittleness and consequently great susceptibility to storm damage should be borne in mind. Its erect growth and easy stripping qualities render it a very desirable variety from a field-handling standpoint.

P. O. J. 36 again proved definitely inferior to P. O. J. 36–M, and there appears to be no reason for the further planting of this variety wherever P. O. J. 36–M is available.

Co. 290 made very vigorous growth in limited plant-cane tests, resulting in yields of cane approximately equal to those obtained with C. P. 807. In yield of sugar per ton of cane this variety proved generally inferior to P. O. J. 36–M, P. O. J. 213, and C. P. 807. However, more extensive tests will be necessary before its merits can be definitely evaluated.

C. P. 177 and C. P. 766 have proved relatively inferior in all comparative tests and apparently do not merit commercial consideration under Louisiana conditions.

In factory tests, Co. 281 showed milling properties approximately equal to those of the P. O. J. varieties, and while somewhat less satisfactory results were obtained with C. P. 807, owing to its higher fiber content, no unusual difficulties were encountered in milling it.

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